**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application. Claims 1, 14, 21, 28, 29, 36, 41, 46, and 49 have been canceled. Claim 15 has been amended to included all of the limitations of its base claim, independent claim 1, and intervening claim 14. Claims 2-4, 6, 11, 19, and 20 have been amended to be dependent upon amended independent claim 15. Claim 31 has been amended to include all of the limitations of its base claim, independent claim 21, and intervening claims 28 and 29. Claims 22-24, 26, 27, 30, 32, and 33 have been amended to be dependent upon amended independent claim 31. Claim 42 has been amended to include all of the limitations of its base claim, independent claim 36, and intervening claim 41. Claims 37-39, 43, 44, and 45 have been amended to be dependent upon amended independent claim 42. Claim 50 has been amended to include all of the limitations of its base claim, independent claim 46, and intervening claim 49. Claims 47, 48, 51, and 52 have been amended to be dependent upon amended independent claim 50. No new matter has been added.

**Listing of Claims:**

Claim 1 (canceled)

Claim 2 (currently amended): The apparatus of claim [[1]]15, wherein the diesel particulate filter is a ceramic wall-flow particulate filter.

Claim 3 (currently amended): The apparatus of claim [[1]]15, wherein the diesel particulate filter comprises a material selected from the group consisting of ceramic foam, sintered metal foam, and ceramic fiber yarn.

Claim 4 (currently amended): The apparatus of claim [[1]]15, wherein the diesel particulate filter comprises a catalyst.

Claim 5 (original): The apparatus of claim 4, wherein the catalyst comprises a material selected from the group of platinum, palladium, and ceramic oxide.

Claim 6 (currently amended): The apparatus of claim [[1]]15, and further comprising a lean-NOx catalyst located upstream of the diesel particulate filter, wherein the lean-NOx catalyst is configured to reduce nitrogen oxides present in the fluid stream.

Claim 7 (original): The apparatus of claim 6, wherein the lean-NOx catalyst is located immediately adjacent to the diesel particulate filter.

Claim 8 (original): The apparatus of claim 7, wherein:

the diesel particulate filter has a surface facing the inlet passage; and

wherein the lean-NOx catalyst is deposited on the surface of the diesel particulate filter facing the inlet passage.

Claim 9 (original): The apparatus of claim 6, wherein the lean-NOx catalyst has a monolithic structure.

Claim 10 (original): The apparatus of claim 6, wherein the lean-NOx catalyst is comprised of a material selected from the group consisting of precious metal, ceramic foam, and metal foam.

Claim 11 (currently amended): The apparatus of claim [[1]]15, and further comprising a diesel oxidation catalyst integrally connected to the heat exchanger, between the inlet and outlet passage, wherein the diesel oxidation catalyst is configured to oxidize carbon monoxide and hydrocarbons present in the fluid stream.

Claim 12 (previously presented): The apparatus of claim 11, wherein the diesel oxidation catalyst comprises metal.

Claim 13 (previously presented): The apparatus of claim 11, wherein the diesel oxidation catalyst comprises ceramic foam or metal foam.

Claim 14 (canceled)

Claim 15 (currently amended): [[The]]An apparatus ~~of claim 14, and further~~for processing a fluid stream, comprising:

a heat exchanger having first and second spaced-apart walls that define an inlet passage and an outlet passage for the fluid stream, wherein the walls are configured to transfer heat from the outlet passage to the inlet passage;

a diesel particulate filter integrally connected to the heat exchanger and positioned to transmit the fluid stream from the inlet passage to the outlet passage, wherein the diesel particulate filter is configured to oxidize carbon monoxide and hydrocarbons, and to collect and oxidize particulate matter present in the fluid stream;

a fuel injector located and configured to inject hydrocarbons into the inlet passage;

one or more pressure sensors configured to produce a pressure signal indicative of any pressure drop through the diesel particulate filter;

a temperature sensor configured to produce a temperature signal, indicative of the temperature at a predetermined position adjacent to the diesel particulate filter; and

a controller, responsive to the pressure signal and the temperature signal, for controlling the rate at which the fuel injector injects hydrocarbons into the inlet passage.

Claim 16 (original): The apparatus of claim 15, wherein the controller is selected to maintain the pressure drop through the diesel particulate filter at or below a specified level.

Claim 17 (original): The apparatus of claim 15, wherein the controller is selected to maintain the temperature at a predetermined position adjacent to the diesel particulate filter at or below a specified level.

Claim 18 (original): The apparatus of claim 15, wherein:

the fluid stream is the exhaust from an engine;

the engine comprises an engine speed sensor configured to produce an engine speed signal indicative of the engine's speed; and

the controller is responsive to the engine speed signal for controlling the rate at which the fuel injector injects hydrocarbons into the inlet passage.

Claim 19 (currently amended): The apparatus of claim [[1]]15, and further comprising a resistance heater configured to heat the fluid stream in the inlet passage.

Claim 20 (currently amended): The apparatus of claim [[1]]15, wherein the first and second spaced-apart walls have a spiral configuration.

Claim 21 (canceled)

Claim 22 (currently amended): The apparatus of claim [[21]]31, wherein the diesel oxidation catalyst comprises metal.

Claim 23 (currently amended): The apparatus of claim [[21]]31, wherein the diesel oxidation catalyst comprises ceramic foam or metal foam.

Claim 24 (currently amended): The apparatus of claim [[21]]31, wherein the lean-NOx catalyst is located immediately adjacent to the diesel oxidation catalyst.

Claim 25 (original): The apparatus of claim 24, wherein:

the diesel oxidation catalyst has a surface facing the inlet passage; and

wherein the lean-NOx catalyst is deposited on the surface of the diesel oxidation catalyst facing the inlet passage.

Claim 26 (currently amended): The apparatus of claim [[21]]31, wherein the lean-NOx catalyst has a monolithic structure.

Claim 27 (currently amended): The apparatus of claim [[21]]31, wherein the lean-NOx catalyst is comprised of a material selected from the group consisting of precious metal, ceramic foam, and metal foam.

Claims 28 and 29 (canceled)

Claim 30 (currently amended): The apparatus of claim [[29]]31, wherein the controller is selected to maintain the temperature at a predetermined position adjacent to the diesel oxidation catalyst at or below a specified level.

Claim 31 (currently amended): [[The]]An apparatus ~~of claim 29~~for processing a fluid stream, comprising:

a heat exchanger having first and second spaced-apart walls that define an inlet passage and an outlet passage for the fluid stream, wherein the walls are configured to transfer heat from the outlet passage to the inlet passage;

a diesel oxidation catalyst integrally connected to the heat exchanger, between the inlet and outlet passage, wherein the diesel oxidation catalyst is configured to oxidize carbon monoxide and hydrocarbons in the fluid stream;

a lean-NOx catalyst located upstream of the diesel oxidation catalyst, wherein the lean-NOx catalyst is configured to reduce nitrogen oxides in the stream;

a fuel injector located and configured to inject hydrocarbons into the inlet passage;

a temperature sensor configured to produce a temperature signal, indicative of the temperature at a predetermined position adjacent to the diesel oxidation catalyst; and

a controller, responsive to the temperature signal, for controlling the rate at which the fuel injector injects hydrocarbons into the inlet passage;

wherein:

the fluid stream is the exhaust from an engine;

the engine comprises an engine speed sensor configured to produce an engine speed signal indicative of the engine's speed; and

the controller is responsive to the engine speed signal for controlling the rate at which the fuel injector injects hydrocarbons into the inlet passage.

Claim 32 (currently amended): The apparatus of claim [[21]]31, and further comprising a resistance heater configured to heat the fluid stream in the inlet passage.

Claim 33 (currently amended): The apparatus of claim [[21]]31, wherein the first and second spaced-apart walls have a spiral configuration.

Claim 34 (original): Apparatus for processing a fluid stream, comprising:

a heat exchanger having first and second spaced-apart walls that define an inlet passage and an outlet passage for the fluid stream, wherein the walls are configured to transfer heat from the outlet passage to the inlet passage;

a diesel particulate filter integrally connected to the heat exchanger and positioned to transmit the fluid stream from the inlet passage to the outlet passage, wherein the diesel particulate filter is configured to oxidize carbon monoxide and hydrocarbons, and to collect and oxidize particulate matter present in the fluid stream;

a diesel oxidation catalyst integrally connected to the heat exchanger, between the inlet and outlet passage, wherein the diesel oxidation catalyst is configured to oxidize carbon monoxide and hydrocarbons present in the fluid stream;

a lean-NOx catalyst located upstream of the diesel particulate filter, wherein the lean-NOx catalyst is configured to reduce nitrogen oxides present in the fluid stream;

a fuel injector located and configured to inject hydrocarbons into the inlet passage;

one or more pressure sensors configured to produce a pressure signal indicative of any pressure drop through the diesel particulate filter;

a temperature sensor configured to produce a temperature signal, indicative of the temperature at a predetermined position adjacent to the diesel particulate filter;

a controller, responsive to the pressure signal and the temperature signal, for controlling the rate at which the fuel injector injects hydrocarbons into the inlet passage;

wherein the controller is selected to maintain the pressure drop through the diesel particulate filter at or below a specified level, and to maintain the temperature at a predetermined position within the diesel particulate filter at or below a specified level; and

a resistance heater configured to heat the fluid stream in the inlet passage.

Claim 35 (original): The apparatus of claim 34, wherein:

the fluid stream is the exhaust from an engine;

the engine comprises an engine speed sensor configured to produce an engine speed signal indicative of the engine's speed; and

the controller is responsive to the engine speed signal for controlling the rate at which the fuel injector injects hydrocarbons into the inlet passage.

Claim 36 (canceled)

Claim 37 (currently amended): The method of claim [[36]]42, wherein oxidizing carbon monoxide and hydrocarbons, and collecting and oxidizing particulate matter present in the preheated fluid stream is performed using a diesel particulate filter.

Claim 38 (currently amended): The method of claim [[36]]42, wherein oxidizing carbon monoxide and hydrocarbons present in the preheated fluid stream is performed using a diesel oxidation catalyst.

Claim 39 (currently amended): The method of claim [[36]]42, and further comprising reducing nitrogen oxides present in the preheated fluid stream.

Claim 40 (original): The method of claim 39, wherein reducing nitrogen oxides present in the preheated fluid stream is performed using a lean-NOx catalyst.

Claim 41 (canceled)

Claim 42 (currently amended): [[The]]A method ~~of claim 41~~for processing a fluid stream, comprising:

preheating the fluid stream by heat exchange using an exiting treated fluid stream;

oxidizing carbon monoxide and hydrocarbons, and collecting and oxidizing particulate matter in the preheated fluid stream, to produce the exiting treated fluid stream; and

injecting hydrocarbon into the preheated fluid stream;

wherein injecting hydrocarbon into the preheated fluid stream comprises:

measuring the temperature at a point in the preheated fluid stream; and

controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured temperature.

Claim 43 (currently amended): The method of claim [[41]]42, wherein injecting hydrocarbon into the preheated fluid stream comprises:

measuring the pressure at points in the preheated fluid stream; and

controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured pressures.

Claim 44 (currently amended): The method of claim [[41]]42, wherein the preheated fluid stream is the exhaust from an engine, and further comprising:

measuring the speed of the engine; and

controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured engine speed.

Claim 45 (currently amended): The method of claim [[36]]42, and further comprising preheating the fluid stream using an external heat source prior to preheating using the exiting treated fluid stream.

Claim 46 (canceled)

Claim 47 (currently amended): The method of claim [[46]]50, wherein oxidizing carbon monoxide and hydrocarbons present in the preheated fluid stream is performed using a diesel oxidation catalyst.

Claim 48 (currently amended): The method of claim [[46]]50, wherein reducing nitrogen oxides present in the preheated fluid stream is performed using a lean-NOx catalyst.

Claim 49 (canceled)

Claim 50 (currently amended): [[The]]A method ~~of claim 49~~for processing a fluid stream, comprising:

preheating the fluid stream by heat exchange using an exiting treated fluid stream;

oxidizing carbon monoxide and hydrocarbons, and reducing nitrogen oxides present in the preheated fluid stream, to produce the exiting treated fluid stream; and

injecting hydrocarbon into the preheated fluid stream;

wherein injecting hydrocarbon into the preheated fluid stream comprises:

measuring the temperature at a point in the preheated fluid stream; and

controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured temperature.

Claim 51 (currently amended): The method of claim [[49]]50, wherein the preheated fluid stream is the exhaust from an engine, and further comprising:

measuring the speed of the engine; and

controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured engine speed.

Claim 52 (currently amended): The method of claim [[46]]50, and further comprising preheating the fluid stream using an external heat source prior to preheating using the exiting treated fluid stream.

Claim 53 (previously presented): A method for processing a fluid stream, comprising:

preheating the fluid stream using an external heat source;

further preheating the fluid stream by heat exchange using an exiting treated fluid stream;

measuring the temperature at a point in the preheated fluid stream;

measuring the pressure at points in the preheated fluid stream;

injecting hydrocarbon into the preheated fluid stream;

controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured temperature and pressures;

reducing nitrogen oxides in the preheated fluid stream; and

oxidizing carbon monoxide and hydrocarbons, and collecting and oxidizing particulate matter in the preheated fluid stream to produce the exiting treated fluid stream.

Claim 54 (previously presented): The method of claim 53, wherein the preheated fluid stream is the exhaust from an engine, and further comprising measuring the speed of the engine and controlling the rate at which hydrocarbon is injected into the preheated fluid stream based upon the measured engine speed.